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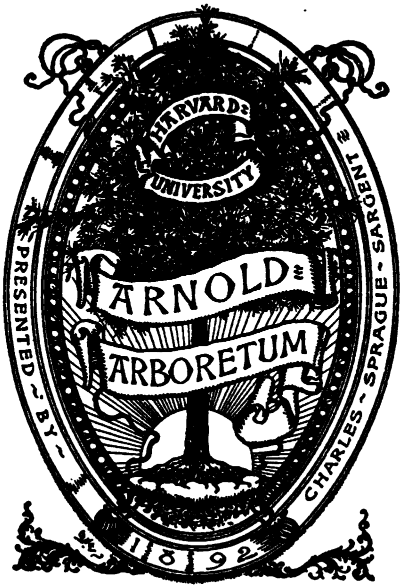

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THEIR NECESSITY AND PRACTICABILITY.

A PAPER READ AT THE

COLUMBUS MEETING

OF THE

Ohio State Forestry Association,

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FORESTAL EXPERIMENT STATIONS.

A PAPER BY ADOLPH LEUE,

Secretary Ohio State Forestry Association.

Through the unwearied labor of a few men, scientists as well as political economists, and through the influence of the press, it has been shown and it is now fully understood that the prosperity of a country is to a very great extent dependent upon the proper condition and distribution of its forests. In view of this significant fact, it is indeed very strange that we, as a people, devote so little attention to forestry—that many of our State governments have even not recognized forestry as a subject worthy of any consideration, and that but in a few States laws have been enacted to promote this great interest. The cause of such profound indifference on the part of our fellow-citizens lies in their want of knowledge of the true condition of our forests, and of he constantly increasing demand upon forest products, and the consequent rapid decrease of the forest area. In support of this assertion, I need not refer you to the enormous destruction of the forests in Wisconsin and Michigan, nor need I point to the South, where the saw-mills are now making great havoc among the forests, and to the deplorable condition in which the denuded regions are left. Our own beautiful State of Ohio, once among the richest in excellent timber forests, has for years been unable to supply its own wants. Some of the most valuable timber-trees have almost entirely disappeared in some counties, and are rapidly dying in others on account of the harsh treatment they receive. Since 1853 there has been a constant decrease in the forest area of almost every county of Ohio, and this decrease has been more rapid during the years between 1870 and 1881 than during the years between 1853 and 1870. A glance at the remains of our woodlands reveals, that the most valuable and even the more ordinary kind of timber has been gathered from them. When the rest shall have been cut, or shall have perished by age, or maltreatment, the forests will disappear; for, owing to the pernicious practice of utilizing woodlands for pastures, the natural rejuvenescence of forests was made impossible. The ruin of the prosperity of our fair State is unavoidable, unless effective measures be taken to supply the future demands upon timber and other forest products, by carefully husbanding of what we have and by planting new forests. Here our difficulties commence. We may indeed sooner expect a spendthrift to instantly cease all revelry and become a careful and economic manager of a nearly squandered fortune, and by personal effort amass another, than to expect a people, whose relation to forests has, we may say, by necessity been hostile for several generations to most economically husband an existing forest, and to plant, cultivate, and manage a new plantation. The late Dr. John A. Warder, whom future generations will call the father of American forestry, was right, when he emphatically declared that we neither know *where, what* nor *how* to plant. Now, there is no other alternative; we must learn this, and the sooner we commence, the better for us, for our fellow-men, for our children, and for our country.

We may learn this in two different ways, namely, deductively and inductively; deductively, by the slow and often unreliable way of experience; inductively, by the more rapid and reliable way of experimenting.

By way of illustrating which of the two methods is preferable, I beg leave to briefly call your attention to the history of the development of agriculture. From the earliest time up to the beginning of the nineteenth century it was a mere empirical art, resting, as it were, solely upon the traditional maxims of experience, without any signs of progress. But when, in the first part of the present century, Liebig and others subjected those ancient maxims of experience to a series of scientific investigations, a new era began to dawn upon the most important occupation of mankind. Since then, such investigations have been carried on in schools of agriculture, which have been established in all civilized countries, and have reached the highest point of perfection in the agricultural experiment stations. The result is most gratifying, for by means of these investigations and systematic experiments agriculture has been elevated to the dignity of an exact science.

This hasty glance at the history of the development of agriculture plainly indicates the course to be pursued in the attempt to raise forestry, the younger sister of agriculture, to the same dignity. A very successful beginning has already been made in Germany, where the idea of establishing forestal experiment stations originated. (1) One or more chief stations, with an appropriate number of subordinate stations, have been established in nearly every State of Germany. The great importance which the governments of the States in which they are established attach to those stations may be seen from the fact that in Germany about $30,000 are expended annually for the maintenance of the same; and their number is steadily increasing. Austria, Switzerland, Italy, Spain, and even Russia, are following the example of Germany.

If those nations whose attainments in forestry are truly great, deem it advisable, and even necessary, to submit the maxims of long experience to a series of scientific investigations and systematic experiments, how much more should we, on this side of the Atlantic, ignorant as we are of almost everything pertaining to a reasonable system of forestry, make an effort to base that system, for which we are longing and which we greatly need, upon scientific principles.

The need of forestal experiment stations in the United States and in Canada has long been felt, and the desire for the speedy establishment of the same has been expressed in various ways and at different times (2). But this has been to no effect, because of the want of a suitable plan of organizing the same. Our climate, the nature of our forest trees, the want of State forests and of trained foresters, render the adoption of the German plan inexpedient, and require a plan that shall be adapted to our peculiar circumstances, and at the same time meet the demands which can reasonably be made upon such an institution.

Convinced of the necessity of speedy action in this matter, I laid before the American Forestry Congress, at its meeting held in St. Paul, Minn., in August, 1883, the following plan of organization with special reference to Ohio:

I.

The object of the forestal experiment station in Ohio is the development of a rational system of forestry adapted to the wants of Ohio.

II.

The station shall consist of a *center* and an unlimited number of *primary* and *secondary* stations.

III.

The center of this station shall be the Agricultural College at Columbus, and shall be under the management of a director, whose sole duty shall be—

1. To preside over all the meetings of the committee on forestal experiment stations (see § VI.)
2. To ascertain the condition of the forests of Ohio, and the wants of forestry in this State, and to institute the necessary experiments and investigations.
3. To prepare plans of experimentation and to devise suitable formulæ for recording the work performed at the primary stations (see § IV.)
4. To attend to all the correspondence connected with the station.
5. To represent the forestal experiment station of Ohio at home and abroad.
6. To report to the General Assembly of the State of Ohio, on or before the second Tuesday of January of each year, the work performed at the station, and to render an account of the money expended in experiment and investigation, and of all other expenditures of the station.
7. To submit an estimate of the probable expenses of the station for the ensuing year.

IV.

The *primary* stations shall consist of at least three acres of ground, each, which shall be devoted to experimenting; and the experiments performed on the same shall be after a definite plan agreed upon by the Committee on Forestal Experiment Stations (see § VI.)

V.

The secondary stations shall be devoted to general investigations, such as analysis of soil, study of Forest-Botany and Forest-Zoology, testing the vitality of seeds of forest trees, determining the comparative value of forest products and testing the adaptability of the various kinds of woods for mechanical and technical purposes.

VI.

The directors of the forestal experiment station and the principles of primary and secondary stations shall constitute the Committee on Forestal Experiment Stations.

VII.

Each primary and each secondary station that may be adapted for making forestal meteorological observations, shall, at the desire of the principal of such station, be provided with the instruments necessary for such purpose.

The Forestry Congress not only heartily endorsed this plan ([3]), but, by a resolution, appointed a committee to recommend the adoption of the same to the several States of the Union and to the provinces of the Dominion of Canada ([4]).

To effect an organization, based upon the above plan, the first step to be taken is the appointment of a director, who, having ascertained the needs of forestry in Ohio, should proceed at once to organize both primary and secondary stations. In this, however, proper care should be taken in locating the primary stations as well as in selecting the parties for conducting the experiments and for making the special investigations; ignorant and unreliable persons should be rigidly excluded.

As the State of Ohio still owns certain tracts of land adapted for forest culture, it would not only be proper, but even advisable, to utilize the same for experiment stations and model forest plantations. But the immediate future of our forests depends, and will depend, chiefly upon the farmers, who almost exclusively constitute the owners of property that is available for forest culture. They are, therefore, the first to reap the benefit of a rational system of forestry, are thus directly interested in forestal experiments, and will, it may be confidently expected, assist in making the enterprise a success. But there is another and a more direct inducement for farmers to participate in this great and noble work. The experimentation is, to him who undertakes it, an excellent school of forestry, which not only charges no tuition, but rewards him with at least the nucleus of a forest, which will greatly enhance the value of his farm.

The readiness with which several very intelligent farmers of this Commonwealth have consented to perform on their own lands, and at their own expense, such experiments as the committee on forestal experiment stations may suggest, guarantees the success of the enterprise.

It is, however, not only the farmer who will be benefited by such forestal experiments; almost all of those engaged in the mechanic arts are more or less interested; while, for example, the builders, the cabinet-makers, the coopers, the carriage and wagon-makers, the manufacturers of matches, spools, bungs, lead-pencils, tool-handles, and of other like articles, depend entirely upon the forest for the material used in their respective arts, there is scarcely any other industry which does not, in one form or another, draw upon the products of the forest. The great railroad and telegraph companies, which consume vast quantities of wood in the construction of their roads and lines, are greatly interested in this question. An abundance of forests, and a cheap method of raising them, will have a material effect upon the prices of the raw forest products, upon which the existence of such industries depends.

But the object of forestal experiment stations is not limited to forest-culture. To test the relative value of forest implements, to devise new methods of obtaining forest products, to find new uses for the same, and to discover new forest products for certain purposes, are very significant features of the secondary stations. While the primary stations aim to furnish the means by which to increase the wealth of the owners of forests, the secondary stations will call into existence new industries and promote those now in existence. It will therefore be to their own advantage, if these several industries foster this great enterprise by making direct researches, or by giving such information as will from time to time be asked of them, or by rendering pecuniary aid which will be needed for such investigation.

The scientific department of the station is of exceedingly great importance, and its development should have the immediate and most scrupulous attention of the director. Although this department should ever be considered a distinct feature of the forestal experiment station, it should never be isolated, but be conjoined with every experiment and investigation. The scientists and the practical forester must go hand in hand, else the object of the institution will not be attained.

Unfortunately, the various branches of science, which find application in forestry, have not been studied very extensively in this peculiar relation in this country; the terms Forest-botany, Forest-zoology, Forest-geodesy, etc., are almost unknown; whence only such specialists as are perfectly reliable and capable of making original investigations should be intrusted with the scientific work of a secondary station.

An experiment station organized according to this plan will, I believe, meet all the demands that can be made upon such an institution. It places the practical work, where it belongs, in the hands of those who are best qualified for it, and who are the recipients of the benefits resulting from the same. The State, by appointing a director, serves merely as an instrument to effect the organization, to collect the results, and to make them known through appropriate reports, which will become the solid foundation of a *system of forestry adapted to the wants and conditions of Ohio.*

NOTES.

(1). For information as to what has been done in Germany, compare:

a. Dr. Richard Hess: "Ueber die Organisation des Forstlichen Versuchswesens". Giessen. 1870.

b. Dr. Franz Baur: "Ueber forstliche Versuchsstationen". Stuttgart. 1868.

c. Dr. Richard Hess: Die forstliche Unterrichtsfrage". Berlin. 1874.

d. Dr. Bernhard Donkelmann: "Die Forstakademie Eberswalde. Berlin. 1880.

e. Dr. Freiherr Ferdinand v. Seckendorf: "Das forstliche Versuchswesen.

f August Ganghofer: "Das forstliche Versuchswesen". Augsburg. 1878–1884.

g. Dr. Ernst Ebermayer: "Die physikalischen Einwirkungen des Waldes auf Luft und Boden". Aschaffenburg. 1873.

h. Dr. Ernst Ebermayer: "Geschichtliche Entwickelung der forstlich meteorologischen Stationen. Essay in "Forstliches Versuchswesen," bei A. Ganghofer. Vol. II, part 1, pp. 1-16.

i. Adolph Leué: Forestal Experiment Stations in Germany; American Journal of Forestry, 1883, August number.

(2). The American Forestry Congress passed at its session in Cincinnati, in 1882, the following resolution:

Resolved, That it is the unanimous sentiment of this Forestry Congress now assembled at Cincinnati, Ohio, that the Congress of the United States should at a very early day take such proper steps and enact such further laws as will increase the forestry interest of this country, and to that end establish at the several agricultural institutions, both State and National, experimental forestry stations, to be constructed on the same general principles as those in Germany.

The above resolution was introduced by Senator Horace Wilson, of Columbus, upon hearing my paper on *Forestal Experiment Stations*, read before the Congress on the day previous.

On the 10th of February 1883, the late Dr. John A. Warder offered, at a meeting of the Ohio State Forestry Association, the following resolutions, which were adopted unanimously:

Resolved, That we beg of all the agricultural colleges established under the land grant of Congress, that they shall lose no time in planting State arboreta and establishing forest experiment stations, where all species adapted to the soil and climate shall be tested, and whence surplus seeds and plants may be distributed. Annual reports of these establishments to be made to the Governors or State boards of agriculture.

Resolved, That Congress be asked to establish one or more Experimental Forest Stations upon the public Domain, where the propagation and testing of useful trees shall be the leading object, with the collection of seeds and plants to be distributed by or under the direction of the United States Agricultural Department, to which bureau these stations shall make annual reports.

In April, 1883, I advocated before the O. S. F. A., in a paper, "Our next Problem," the speedy establishment of Forest Experiment Stations, and at a subsequent meeting submitted a plan of organizing such stations.

(3.) The *St. Paul Daily Globe*, of August 9, 1883, had the following in reference to the plan submitted by the writer:

"Prof. N. H. Egleston, of Washington, and Mr. Memier, of Illinois, endorsed the paper very heartily, as a simple, practical plan that, it seemed them, would recommend itself to general favor.

"Judge Higley, of Cincinnati, briefly explained how the plan came to be adopted by the Ohio Association, detailing the efforts of the society to get State aid for forest culture, under the head of a State forester, from the failure of which came the plan outlined in this paper, and which, he said, was meeting with much better success than was anticipated.

"Dr. Hough, of Lowville, thought such a plan should have a strong claim upon the leading educational institutions of a State, which could most profitably conduct the experiments mapped out.

"Dr. G. B. Loring had no doubt that the stations provided for would prove a success in the great State of Ohio, but he thought these stations should be as closely allied with our colleges as possible. Time was, when the mention of a college in connection with agriculture or forestry met with ridicule. But that time has passed, and as a rule, legislators, backed by public sentiment, stand ready to grant all reasonable aid to such institutions, and he argued that the true road to final success in agricultural and forestal developments was these institutions; and as necessary means, he urged that the best of talent and highest cultivation be secured to conduct them, thus placing them upon that elevated plane which their importance demanded, and giving them their proper position in the scientific teachings of the day."

Prof. N. H. Egleston, now Chief of the Forestry Division at Washington, wrote to me under June 29, 1883:

"I am very glad to know that you have moved in this matter of establishing in Ohio forestal experiment stations, and so far as I understand your plan, it seems to me a good one. I have long thought the establishment of such stations one of the most important and first things to be done. I hope that you will be able to carry out your plan. The example of such a great central State will encourage others to follow in the same direction."

Robert Douglas, the well-known Arboriculturist of Waukegan, Ill., writes me under September 11, 1883, in reference to the experiments proposed: "Experiments of this sort will teach us more, even if planted on a small scale, than the past 20 years have taught us in all the theorizing at horticultural and forestry conventions."

(4.) That committee consists of Prof. N. H. Egleston, of Washington, D. C.; H. W. Morgan, of Amherstburg, Ont., with Adolph Leue, of Cincinnati, as chairman. Owing to the great distance at which the members of that committee reside, no meeting was effected, and no action has been taken.

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